Are People Being Screened for Colorectal Cancer as Recommended? Results from the National Health Interview Survey

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Background. The evidence is now compelling that colorectal cancer incidence and mortality can be reduced by screening, and medical organizations recommend regular screening among persons of average risk aged 50 years or older. We sought to determine whether appropriate screening has become more widespread now that consensus over its value has been achieved.

Methods. We analyzed data from the 1992 and 1998 National Health Interview Survey, an in-person survey of a nationally representative sample of the U.S. population. Persons aged ≥50 years (4428 in 1992, 12,629 in 1998) were questioned about their use of colorectal cancer screening.

Results. Self-reported use of fecal occult blood testing and proctoscopy increased slightly from 1992 to 1998. In 1998, however, only an estimated 22.9% of Americans aged ≥ 50 years had been screened with either the homeadministered fecal occult blood testing in the past year or proctoscopy within 5 years. Nearly half of fecal occult blood testings were performed with a sample taken during an in-office physical examination rather than with the recommended home kit.

Conclusion. Most eligible persons are still not meeting the screening recommendations for colorectal cancer. Education is needed for both the public and health care providers to increase their compliance with current guidelines.

Key Words: colorectal neoplasms; mass screening; occult blood; proctoscopy.

INTRODUCTION

Colorectal cancer is the second leading cause of cancer death in the United States, following lung cancer

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[1]. The evidence is now compelling, however, that both the incidence of colorectal cancer and death from that disease can be reduced through regular screening. Randomized controlled trials have demonstrated a reduction in both incidence and mortality with either annual or biennial fecal occult blood testing (FOBT) [2–5] and several case—control studies have found sigmoidoscopy to be associated with reduced colorectal cancer mortality [6-8].

Since 1980, the American Cancer Society (ACS) has recommended screening for colorectal cancer [9], but it was not until the late 1990s that a consensus was reached that screening is effective in reducing colorectal cancer mortality [10-13]. In 1996, following publication of evidence from a number of studies, the U.S. Preventive Services Task Force (USPSTF) first issued the recommendation that average-risk persons aged ≥50 years be screened with FOBT and/or flexible sigmoidoscopy [10]. The USPSTF guideline was quickly followed by comprehensive guidelines developed by a consortium of professional organizations [11] and by a revision and expansion of the existing ACS guidelines [12,13]. While the details of these three guidelines are not identical, they each recommend screening for average-risk persons aged ≥50 years with one or more of the following tests: annual FOBT, periodic sigmoidoscopy, colonoscopy every 10 years, or double-contrast barium enema every 5-10 years. In response to the growing recognition of the effectiveness of screening, efforts have intensified at the federal, state, and local levels to promote screening for colorectal cancer.

Are eligible adults now being screened as recommended? The National Health Interview Survey (NHIS), an in-person household survey of a representative sample of the U.S. population, has collected, at several points in time, information on the use of colorectal cancer screening tests. The NHIS has obtained information on whether the tests were performed for



screening or diagnostic purposes and, for FOBT, whether the test was done with a home kit or with a sample obtained during a rectal examination in the office by a health care provider. Because of concerns over sensitivity and specificity, the latter method is not recommended, although it is commonly done in practice [14].

Data collected by the NHIS for 1992 indicate that rates of self-reported colorectal cancer screening were then very low, albeit slightly higher than those observed in the 1987 NHIS [15]. We analyzed data from the 1992 and 1998 NHIS to determine whether appropriate screening has become more widespread now that consensus over its value has been achieved. We also sought to determine whether rates differ by sociodemographic factors and measures of health care access.

METHODS

The NHIS, which is conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention, uses multistage sampling in collecting health and demographic data through in-person interviews with a sample of the civilian, noninstitutionalized U.S. population aged ≥18 years. Questions on colorectal cancer screening were included in the NHIS in 1987, 1992, and 1998. In 1987 and 1992, the Cancer Control Supplement included questions on the utilization of cancer screening modalities. In 1998, the Adult Prevention Module included questions on cancer screening. In all 3 years, tests performed for screening were differentiated from those performed for diagnostic purposes. Data from 1992 and 1998 are presented in this report. The final response rate was 87.0% for the Cancer Control Supplement in 1992 and 72.6% for the Adult Prevention Module in 1998 [16,17].

In both 1992 and 1998, respondents aged ≥40 years were asked about their use of the blood stool test ("when the stool is examined to determine whether it contains blood") and of the proctoscopic exam ("when a tube is inserted in the rectum to check for problems"). While the term "proctoscopic exam" is often used to refer to an examination using a short rigid endoscope, it is sometimes used to refer to any sigmoidoscopy, including flexible sigmoidoscopy using a 60-cm flexible instrument. The term "proctoscopic exam" was maintained in the NHIS for uniformity with earlier surveys to allow trend analysis.

In 1992, respondents were first asked if they had heard of each test, and only those respondents who answered affirmatively were asked further questions about the test. For this analysis, we assumed that respondents who answered "no" or "don't know" to the "ever heard of" questions had never had the test. In 1998, by contrast, there was no lead-in question that asked respondents if they had heard of the tests. In

both 1992 and 1998, respondents were asked if they had ever had each test and the time since their last one. Screening tests were distinguished from diagnostic tests by asking the reason for the last test. Tests that were "part of a routine physical exam/screening test" were classified as screening tests. Tests that were done "because of a specific health problem" or as "follow-up to a previous health problem" or "other" were considered diagnostic. In 1992, only respondents who reported having had their most recent test within 3 years of the interview were asked the reason for that test. In 1998, however, all respondents who reported having had a test were asked the reason for their most recent test, regardless of how long ago it had taken place.

In 1992, respondents who reported having had a blood stool test were asked "Did you perform this blood stool test yourself or was it done by a doctor or other medical person?" Respondents who performed the test themselves were classified as having used the home kit. In 1998, respondents who reported having had a blood stool test were asked "Did the doctor take a sample during a physical exam? Or did you take samples at home using a kit and send them back to the doctor or lab?" Respondents who took samples at home were classified as having used the home kit. We analyzed use of proctoscopy within both 3 and 5 years. Although the ACS guideline in effect in 1992 recommended sigmoidoscopy every 3-5 years, guidelines published in 1997 by the ACS and the consortium of professional organizations recommend sigmoidoscopy every 5 years [10-12,18].

Our analysis included only respondents aged ≥50 years because it is recommended that colorectal cancer screening be initiated at 50 for persons who do not have a family history of the disease or certain other risk factors. In 1992, a total of 4,428 respondents aged \geq 50 years were interviewed for the Cancer Control Supplement. Respondents who refused to answer a question about one of the two tests or from whom a response was not ascertained were excluded from all analyses related to that test. In addition, respondents who did not know when or why they had their most recent test were excluded from analyses related to that test. For FOBT, respondents who did not know whether they had performed that test themselves or whether it was done by a health care provider were excluded from analyses related to that test. For 1992, the number of respondents excluded from analysis of the FOBT questions was 136 (3.1%); for proctoscopy, 117 (2.6%). For the analysis of proctoscopy within the past 5 years, an additional 88 (2.0%) respondents could not be classified and were excluded.

In 1998, a total of 12,629 respondents aged \geq 50 years were questioned. Applying the same exclusion

TABLE 1

Distribution of Study Population by Selected Demographic Characteristics, 1992 and 1998

	1992			1998		
	N^a	%	SE	N^a	%	SE
Age						
50-59	1,427	36.3	1.0	4,386	39.4	0.6
60-69	1,335	31.3	0.8	3,392	28.3	0.5
70-79	1,053	23.0	0.7	2,909	21.9	0.5
80+	496	9.4	0.5	1,503	10.4	0.3
Sex						
Male	1,676	44.5	0.9	5,013	45.4	0.5
Female	2,635	55.5	0.9	7,177	54.6	0.5
Race						
White	3,693	87.8	0.7	10,243	87.2	0.4
Black	530	9.6	0.6	1,467	8.9	0.3
Other	88	2.6	0.4	480	3.9	0.2
Hispanic						
Yes	301	4.4	0.4	1,207	6.6	0.3
No	3,987	95.6	0.4	10,974	93.5	0.3

^a Based on the sample of respondents included in the analysis of the proctoscopy questions. For some variables, the numbers do not add up to the total because of missing data.

Source: National Health Interview Survey, National Center for Health Statistics, CDC.

criteria as in 1992, 501 (4.0%) respondents were excluded from analysis of the 1998 FOBT questions and 439 (3.5%) from analysis of the proctoscopy questions. In this year, a combined measure was also computed, representing the estimated proportion of the 50+ population who had undergone either FOBT for screening with the home kit within the past year or/and proctoscopy for screening within 5 years. Only respondents who were included in both the individual FOBT and proctoscopy questions were included in this combined measure (N=12,072).

We examined use of FOBT and proctoscopy by age, sex, Hispanic ethnicity, race, income, education, health insurance coverage, and having a usual source of health care (all self-reported).

To take into account the design of the complex, multistage sample, we used SUDAAN software to calculate the population estimates and their standard errors [19]. All proportions were adjusted for age in 5-year groups using the projected U.S. population for 2000 as the standard population [20].

RESULTS

The age, sex, and race distributions of the 1992 and 1998 study populations were similar (Table 1).

In 1998, an estimated 48.6% of the U.S. population aged \geq 50 years reported ever having had FOBT, a figure virtually unchanged from 1992 (Table 2). Use of FOBT within the past year increased slightly from 1992 to 1998 (from 21.3 to 24.8%). In both years, ap-

proximately 80% of those tests were performed for screening. Overall, in 1998, 54% of FOBT within the past year was performed with the home kit, versus 45% for 1992.

In 1998, an estimated 36.2% of the U.S. population aged ≥50 years reported ever having had proctoscopy, up from 32.9% in 1992 (Table 3). The proportions reporting proctoscopy within 3 or 5 years also rose slightly from 1992 to 1998. In both years, slightly less than 60% of tests were for screening.

We examined use of FOBT and proctoscopy by age, sex, race, ethnicity, income, education, health insurance coverage, and usual source of care. Use within recommended intervals (1 year for FOBT with home kit, 5 years for proctoscopy) for any reason increased from 1992 to 1998 for most subgroups (Table 4).

Rates in 1998 for recommended use of FOBT for screening (home kit, within 1 year) and proctoscopy for screening (within 5 years) or of either test are shown by sociodemographic and health care access subgroup in Table 5. For all measures, reported use was slightly higher with each decade of age from 50 to 59 through 70 to 79 and then was lower for the group \geq 80 years. While men and women were equally likely to report FOBT, men were more likely to report proctoscopy. For both tests, Hispanics were less likely than non-Hispanics to report screening. Whites were more likely to report screening than blacks or individuals of other races. For all measures, those with higher income or education were more likely to report screening, and those who completed college were more than twice as likely as those with less than a high school education to report screening. Of all subgroups examined, persons without health insurance and persons without a usual source of care were the least likely to report screening. As might be expected, the subgroups generally varied less in reported use of these tests for diagnostic purposes than for screening (data not shown).

The proportion of FOBT performed using the home kit varied by subgroup for certain demographic factors. For example, among non-Hispanics, whites, and those with income \geq \$20,000, a larger proportion of tests were with the home kit than was seen in Hispanics, blacks, and those with incomes below \$20,000 (data not shown).

DISCUSSION

Although some improvement was seen since 1992, in 1998 most people who should be getting screened for colorectal cancer were still not being tested. Our analysis indicates that in 1998, approximately one in four Americans aged ≥50 years had been screened with either home FOBT within 1 year or proctoscopy within 5 years. Although variability by sociodemographic and health care access factors was seen in the use of screen-

TABLE 2Reported Use of FOBT, by Year

			Had within 1 year					
		Ever had for any	For any	y reason	For screening			
Year	N	reason, either method ^a	Either method ^a	Home kit only	Either method ^a	Home kit only		
1992 1998	4,292 12,128	48.1 (46.1–50.1) ^b 48.6 (47.4–49.8)	21.3 (19.9–22.7) 24.8 (23.8–25.8)	9.6 (8.4–10.8) 13.5 (12.7–14.3)	17.2 (15.8–18.6) 19.5 (18.7–20.3)	8.0 (6.9–9.1) 11.1 (10.4–11.8)		

^a FOBT performed either with a sample taken during an in-office digital rectal examination or with the home kit.

Source: National Health Interview Survey, National Center for Health Statistics, CDC.

ing, no subgroup reported a rate of recent screening with either test above 34%. Persons with less education, lower income, no health insurance, or no usual source of health care continued to be the least likely to be screened. Hispanics were less likely to use these tests and women continued to be less likely to report proctoscopy screening than men.

These findings are consistent with those recently reported by Breen et al. [21], using data from the same survey, but time intervals different than those reported here (2 years for FOBT, 3 years for proctoscopy). Our findings are also consistent with the low rates of sigmoidoscopy or colonoscopy and FOBT reported from the Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey of the U.S. population that uses random-digit dialing. The BRFSS collects information on the use of these tests but does not distinguish between tests for screening and those for diagnostic purposes [22,23]. In the 1999 BRFSS, 20.6% of respondents aged ≥50 years reported FOBT using the home kit within the past year and 33.6% reported sigmoidoscopy or colonoscopy within 5 years [23]. The minor variation in estimates between the NHIS and BRFSS may be explained by several differences [e.g., in sampling methods, interviewing (in-person vs telephone) and response rates].

The 1992 and 1998 NHIS did not ask about the use of colonoscopy or barium enema, both of which may be used for colorectal cancer screening. It is unlikely that these procedures were frequently used for screening, however. A 1999–2000 national survey of primary care physicians indicated that these physicians were much

more likely to recommend FOBT or sigmoidoscopy than colonoscopy or barium enema for colorectal cancer screening to their average-risk patients (C. Klabunde, personal communication).

This analysis has several limitations. First, it is possible that we are underestimating the use of flexible sigmoidoscopy because some respondents may not have reported flexible sigmoidoscopy exams when asked about the use of "proctoscopy." However, it seems unlikely that we are substantially underestimating sigmoidoscopy use. "Proctoscopy" is probably a familiar term for these endoscopic procedures, and a description of the test was included in the question. In 1997, when the BRFSS added the term "sigmoidoscopy" to the questions on proctoscopy, estimates of use remained essentially unchanged from 1995 (unpublished data).

Second, some respondents may have incorrectly reported their use of screening tests or other information. Studies comparing self-report of colorectal cancer screening to information from medical records have generally found moderate to good agreement between the two data sources [24–28]. However, the validity of self-reported FOBT performed with samples taken during a physical exam is not known. Finally, because the questions about test use changed somewhat between 1992 and 1998, different assumptions had to be made for the two years, and thus the small increase in screening from 1992 to 1998 reported here should be interpreted with caution. These limitations notwithstanding, the NHIS is a unique and valuable source of information on screening in the United States. Because

TABLE 3Reported Use of Proctoscopy, by Year

		Ever had for	Had within 3 years		Had within 5 years	
Year	N	any reason	For any reason	For screening	For any reason	For screening
1992	4,311	32.9 (31.3-34.5) ^a	16.8 (15.5–18.1)	9.4 (8.4–10.4)	21.8 ^b (20.4–23.2)	
1998	12,190	36.2 (35.2–37.2)	22.9 (22.0–23.8)	13.6 (12.9–14.3)	27.3 (26.3–28.3)	15.9 (15.1–16.7)

^a % (95% CI).

Source: National Health Interview Survey, National Center for Health Statistics, CDC.

^b % (95% CI).

 $^{^{}b}$ N = 4,223.

TABLE 4 Reported Use of FOBT and Proctoscopy for Any Reason, by Sociodemographic and Health Care Access Factors, 1992 and 1998

			FOBT ^a	$Proctoscopy^b$	
Characteristic		N^c	% (95% CI)	N^c	% (95% CI)
Age					
50-59	1992	1,421	9.4 (7.5–11.3)	1,414	18.6 (16.3-20.9)
	1998	4,369	10.8 (9.8–11.8)	4,386	22.0 (20.5–23.5)
60-69	1992	1,332	10.8 (8.6–13.0)	1,305	22.0 (19.6–24.5)
	1998	3,374	14.6 (13.2–16.0)	3,392	31.3 (29.5–33.1)
70–79	1992	1,047	11.3 (9.2–13.4)	1,026	26.4 (23.9–28.9)
	1998	2,891	17.7 (16.1–19.3)	2,909	34.3 (32.3–36.3)
80 +	1992	492	4.8 (2.7–6.9)	478	23.4 (19.2–27.6)
-	1998	1,494	12.3 (10.5–14.1)	1,503	23.6 (21.1–26.1)
Sex					
Male	1992	1,671	9.1 (7.2–11.0)	1,649	26.1 (23.7–28.5)
	1998	4,981	13.0 (11.9–14.1)	5,013	32.6 (31.1–34.1)
Female	1992	2,621	10.1 (8.6–11.6)	2,574	18.5 (16.8–20.2)
	1998	7,147	13.9 (13.0–14.8)	7,177	23.0 (21.8–24.2)
Hispanic			()		
Yes	1992	299	3.2 (0.9–5.5)	300	18.8 (14.4–23.2)
	1998	1,199	7.8 (6.0–9.6)	1,207	19.7 (16.9–22.5)
No	1992	3,969	9.8 (8.6–11.0)	3,901	21.9 (20.4–23.4)
_	1998	10,920	13.8 (13.0–14.6)	10.974	27.8 (26.8–28.8)
Race	4000		100(00110)		000 (00 # 00 #)
White	1992	3,672	10.0 (8.8–11.2)	3,614	22.0 (20.5–23.5)
DI I	1998	10,200	13.9 (13.1–14.7)	10,243	27.8 (26.7–28.9)
Black	1992	535	6.9 (3.6–10.2)	521	21.4 (16.4–26.4)
0.1	1998	1,456	9.8 (7.9–11.7)	1,467	24.3 (21.3–27.3)
Other	1992	85	3.0 (0.0–6.0)	88	16.3 (9.0–23.6)
T.,	1998	472	11.5 (8.4–14.6)	480	22.7 (18.3–27.1)
Income	1000	0.000	71 (57 05)	0.040	107 (147 107)
<\$20,000	1992	2,082	7.1 (5.7–8.5)	2,042	16.7 (14.7–18.7)
~ 690,000	1998	4,190	9.5 (8.3–10.7)	4,212	20.9 (19.2–22.6)
≥\$20,000	1992	2,084	11.1 (9.3–12.9)	2,057	25.6 (23.4–27.8)
Unknown	1998 1992	7,165 126	15.3 (14.3–16.3)	7,201 124	29.9 (28.7–31.1)
Unknown	1992	773	6.3 (1.1–11.5)	124 777	24.4 (14.3–34.5)
Education	1990	113	11.1 (8.4–13.8)	111	26.5 (23.2–29.8)
<12 years	1992	1,484	7.3 (5.7–8.9)	1,466	16.8 (14.5–19.1)
12 years	1998	3,431	9.0 (7.9–10.1)	3,457	20.3 (18.6–22.0)
High school graduate	1992	1,578	9.6 (7.8–10.1)	1,543	20.5 (18.1–22.9)
riigii school graddate	1998	3,797	13.1 (12.0–14.2)	3,810	25.3 (23.7–26.9)
Some college	1992	591	10.7 (7.8–13.6)	578	26.5 (22.3–30.7)
Some conege	1998	2,613	15.4 (13.9–16.9)	2,623	29.9 (27.8–32.0)
≥College	1992	617	12.5 (9.1–15.9)	614	31.9 (27.1–36.7)
=Conege	1998	2,158	18.0 (16.1–19.9)	2,169	37.3 (35.0–39.6)
Insurance coverage	1330	2,130	16.0 (10.1–19.9)	۵,105	37.3 (33.0–33.0)
Yes	1992	3,979	10.0 (8.7-11.3)	3,914	22.3 (20.8–23.8)
165	1998	11,259	14.0 (13.2–14.8)	11,318	28.3 (27.3–29.3)
No	1992	240	1.6 (0.2-3.0)	237	14.9 (9.1–20.7)
140	1998	835	3.6 (1.3–5.9)	838	9.4 (6.1–12.7)
Has usual source of health care?	1330	033	3.0 (1.3–3. <i>a)</i>	030	J.T (U.1-12.7)
Yes	1992	3,742	10.4 (9.1–11.7)	3,677	22.8 (21.3-24.3)
103	1998	11,212	14.2 (13.4–15.0)	11,271	28.6 (27.6–29.6)
No	1992	541	3.7 (1.5–5.9)	537	14.5 (10.4–18.6)
110	1992	911	3.8 (2.4–5.2)	914	9.0 (6.6–11.4)
	1 9 9 0	311	J.O (2.4-J.2)	314	3.0 (0.0-11.4)

^a FOBT within 1 year with home kit for any reason.
^b Proctoscopy within 5 years for any reason.
^c For some variables the numbers do not add to the total because of missing data.

Source: National Health Interview Survey, National Center for Health Statistics, CDC.

TABLE 5Reported Use of FOBT and Proctoscopy for Screening, by Sociodemographic and Health Care Access Factors, 1998

	$FOBT^a$		$Proctoscopy^b$		FOBT ^a or proctoscopy ^b	
Characteristic	N^c	% (95% CI)	N^c	% (95% CI)	N^c	% (95% CI)
All	12,128	11.1 (10.4–11.8)	12,190	15.9 (15.1–16.7)	12,072	22.9 (22.0–23.8)
Age						
50-59	4,369	9.0 (8.1-9.9)	4,386	13.2 (12.0-14.4)	4,361	19.3 (17.9-20.7)
60-69	3,374	12.7 (11.4–14.0)	3,392	18.7 (17.2-20.2)	3,361	26.4 (24.6-28.2)
70-79	2,891	14.2 (12.8-15.6)	2,909	19.4 (17.7-21.1)	2,872	27.9 (26.1-29.7)
80+	1,494	9.2 (7.7-10.7)	1,503	12.3 (10.3-14.3)	1,478	18.9 (16.7-21.1)
Sex						
Male	4,981	11.0 (10.0-12.0)	5,013	21.1 (19.8-22.4)	4,956	27.1 (25.6-28.6)
Female	7,147	11.2 (10.4-12.0)	7,177	11.6 (10.8-12.4)	7,116	19.6 (18.5-20.7)
Hispanic						
Yes	1,199	6.0(4.4-7.6)	1,207	10.8 (8.6-13.0)	1,196	14.9 (12.3-17.5)
No	10,920	11.4 (10.7-12.1)	10,974	16.2 (15.4-17.0)	10,867	23.4 (22.4-24.4)
Race						
White	10,200	11.6 (10.9-12.3)	10,243	16.1 (15.3–16.9)	10,152	23.6 (22.6-24.6)
Black	1,456	7.8 (6.0-9.6)	1,467	14.6 (11.8–17.4)	1,448	18.4 (15.8-21.0)
Other	472	9.0 (6.1-11.9)	480	12.6 (8.8-16.4)	472	18.7 (14.3-23.1)
Income						
<\$20,000	4,190	6.7 (5.8–7.6)	4,212	10.3 (9.1-11.5)	4,169	15.2 (13.7-16.7)
≥\$20,000	7,165	13.0 (12.1-13.9)	7,201	17.8 (16.9–18.7)	7,140	25.9 (24.7-27.1)
Unknown	773	9.2 (6.8-11.6)	777	17.0 (14.0-20.0)	763	21.5 (18.2-24.8)
Education						
<12 years	3,431	6.9(5.9-7.9)	3,457	10.9 (9.6-12.2)	3,413	15.5 (14.0-17.0)
High school graduate	3,797	10.8 (9.7-11.9)	3,810	13.0 (11.7-14.3)	3,778	20.3 (18.8-21.8)
Some college	2,613	12.9 (11.4-14.4)	2,623	17.8 (16.1–19.5)	2,605	26.1 (24.0-28.2)
≥College	2,158	15.3 (13.5-17.1)	2,169	25.4 (23.4-27.4)	2,148	33.8 (31.6-36.0)
Insurance coverage						
Yes	11,259	11.6 (10.9-12.3)	11,318	16.6 (15.8-17.4)	11,203	23.9 (22.9-24.9)
No	835	3.0(0.7-5.3)	838	6.6 (3.4-9.8)	835	8.1 (4.9–11.3)
Has usual source of health care?						
Yes	11,212	11.8 (11.1-12.5)	11,271	16.6 (15.8-17.4)	11,158	24.1 (23.1-25.1)
No	911	2.2 (1.1-3.3)	914	5.5 (3.7-7.3)	909	6.7 (4.7-8.7)

^a FOBT within 1 year with home kit for screening.

Source: National Health Interview Survey, National Center for Health Statistics, CDC.

the survey is conducted by in-person interview, people without telephones are included, and relatively high response rates have consistently been achieved. In addition, NHIS provides the only national data available on whether these colorectal cancer tests were performed for screening or diagnostic purposes and on the use of FOBT with samples obtained during a digital rectal examination.

Using self-reported data, we found that approximately half of FOBT is performed with samples taken during a physical exam rather than with the home kit, a proportion that varied by subgroup for certain demographic factors. The recommended method for FOBT, involving the sampling of two sites from each of three stool specimens using a kit at home, with certain dietary and medication restrictions, has been shown in three randomized controlled trials to reduce colorectal cancer mortality. The effectiveness of FOBT with a single fecal sample obtained during a digital rectal

exam has not been studied directly in a clinical trial, and it remains controversial. That approach is probably less sensitive and less specific than multiple-specimen home FOBT [11,14,29]. Our results indicate that office-based FOBT probably is a common practice. This is consistent with information from a national survey of primary care physicians, which indicates that a substantial proportion of physicians use office-based FOBT for their patients (C. Klabunde, personal communication). Although physicians' use of this approach may be motivated by concern that their patients would be unlikely to complete the self-administered test, some physicians may be unaware that the home kit is the recommended method. Physician education regarding the proper test method may be needed.

Being able to distinguish tests for screening purposes from those for diagnosis is useful. We found that more than 40% of proctoscopic exams were performed for health problems rather than for screening. In addi-

^b Proctoscopy within 5 years for screening.

For some variables the numbers do not add to the total because of missing data.

tion, when analysis is limited to tests for screening, disparities in their use by income, education, and other factors become more apparent. Furthermore, the ability to distinguish tests performed for screening from those for diagnostic purposes helps in evaluating the effectiveness of efforts to educate the public about the need to be screened, i.e., tested in the absence of symptoms

Clearly, any increase in colorectal cancer screening by 1998 was very modest, unlike the dramatic increase in the use of screening mammography observed in the late 1980s and early 1990s [15]. However, this rapid rise in the use of mammography followed a slow start. In 1987, a number of years after compelling evidence for the value of mammography screening became available, Howard referred to the "unrealized potential" of mammography for cancer control, noting that by the early 1980s, only about 15 to 20% of American women aged 50 or older had ever had a mammogram [30]. Data from the NHIS indicated that, in 1987, only 16.5% of women aged 50 or older had been screened with mammography within the preceding year [15]. After that, mammography rates began to increase rapidly, in response to intense efforts at the local, state, and national levels to educate the public and health care providers about the value of mammography and to reduce financial and other barriers to access.

The low rates of screening for colorectal cancer in 1998 should not lead to undue pessimism, considering that they reflect behavior only a few years after consensus over the value of screening for this disease was reached. Efforts have now intensified to promote colorectal cancer screening. Examples of efforts at the national level to increase awareness of the importance of screening include the designation by the U.S. Congress of March as Colorectal Cancer Awareness Month and the development by the Centers for Disease Control and Prevention and the Center for Medicare and Medicaid Services of "Screen for Life," an ongoing multimedia awareness campaign for providers and the public about colorectal cancer screening (www.cdc.gov/cancer/ screenforlife). Efforts are also growing at the state and local levels to promote screening for this disease. In an attempt to reduce financial barriers to screening, the federal government made colorectal cancer screening a covered Medicare benefit in 1998, and a rapidly growing number of states are enacting legislation requiring coverage by private insurers. Clearly, these and other activities are needed to substantially increase screening rates and reduce mortality from this important disease. Special efforts should be made to ensure that the disparities by income, education, race, ethnicity, and health care access are reduced rather than exaggerated.

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